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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



NOVEMBER 14, 1936

You Breathe It

See Page 307

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DO YOU KNOW?

Rickets rarely develops in a human being after the first two years of life.

Thorns, splinters, and tiny bones were the first pins used to fasten clothing.

Navajo Indian women do not copy a pattern in weaving a rug; they carry the design in their minds.

Palms cannot be expected to thrive outdoors in winter where the mercury falls below ten degrees above zero.

A new synthetic wood called "isorel" is being made in France by compressing wood fibers with synthetic resins, and is said to be a non-conductor of sound and moisture.

Tests show that canned strained spinach, peas, tomatoes, and green beans vary in the amount of vitamin C they contain, from year to year, indicating that it is difficult to standardize canned goods on this point.

Early Greeks in Homer's day looked upon milk as food for mere barbarians.

The ancient Romans reclined on couches when they read, wrote, or studied.

Roman schoolboys shouted their lessons, thereby making a schoolhouse a "noisy zone."

Forest fires have been known to travel faster than a man can walk, for a distance of a mile or more.

Barn swallows that spend their winters in Brazil fly as far north as Greenland and Alaska for the summer.

A new windshield wiper for winter driving is equipped with bars of a rock salt compound to melt snow and ice.

When the explorer Cartier tried Indian tobacco offered by Indians of the St. Lawrence region, he found it "almost as hot as pepper."

WITH THE SCIENCES THIS WEEK

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ENGINEERING

Greater Comfort and Safety Stressed in 1937 Automobiles

More Head Room Gained by Lowering Floor With Use of Hypoid Gear or Triple-Jointed Propeller Shaft

THE NEW 1937 model automobiles will be more comfortable, safer and more economical than any of their predecessors, Norman G. Shidle, editor of the *Journal, Society of Automotive Engineers*, told Science Service in giving a cross section of what's ahead in motor-dom.

The trend to lower roofs has stopped. Every effort has been made to lower the propeller shaft of cars to get rid of the raised tunnel which last year ran through the space in the rear. A lowering of the floor from one and a half to three inches has been achieved. The consumer's complaint of tripping in entering and leaving the car is removed; even if more headaches for the design and lubrication engineer have arisen.

The net effect of lowering floor height while keeping the roof at its 1936 level, is more headroom inside the car and greater seat heights that permit one to get out of, and into, seats.

Bodies are larger, in general, with increased luggage space, wider and higher door openings. The injury menace in many pedestrian sideswipe accidents has been removed in some cars by the new type safety door handles. The sharp-pointed, rapier-like handles of last year's models are few and far between. Instead, the ends of the handles are curved in toward the body so that they will not be likely to inflict painful and fatal injuries.

Last winter's severe cold, throughout the country, has led almost universally to the permanent installation of windshield defrosters which generally consist of ducts leading warmed air up to the inside of the windshield.

More Room in Front

Emergency brake levers are disappearing or are so designed that they obtrude less into the foot space of the front seat. With extra seat width, a third passenger in front becomes less a driving hazard. The shifting, in some cars, of the steering wheel to the left also provides additional front seat room.

Additional safety factors include the all-steel top, which is now almost uni-

versal, and extra padding on the top back edge of the front seat to protect rear seat passengers if they are thrown forward in a sudden stop. Silk cords generally replace the metal coat rail on the front seat for the same safety gain.

And speaking of stopping: hydraulic brakes will be practically universal on all 1937 cars. At least, every manufacturer has some product with this feature.

The problem of better radio reception has been a serious one in the 1937 designs. The all-steel top effectively shields the older-style built-in aerial in the roof. The running board is now the favored place. To be effective, it must be electrically insulated from the car and even then offers problems in gaining reception of the quality the American radio enthusiast receives in his home. Motor car radio reception will be improved over 1936, but some makes of cars offer optional, outside, attached aerials for those people who want extra-quality reception despite the possible unsightly appearance. All cars of 1937 have space designed for a radio installation.

Tilted Windshields

Windshields are generally tilted slightly more than in 1936.

While each manufacturer strives for some characteristics which bring an individual appearance, the general trend is to longer, more bullet-like heads, and wider single bar bumper. Bumper guards are turning into standard equipment, since they can frequently serve as a mounting for the maker's monogram.

Outside horns are going under the motor hood and if matched horns are used their pitch is accurately checked.

On the instrument panel, the trend away from often-meaningless calibration marks is continuing. Oil pressure gages in some cases merely say "no" when the oil pressure drops. A tiny red light or "not," in some cars, indicates when the generator is not functioning.

It is safe to predict that the leveling of the floor in the tonneau will presently enrich the layman's vocabulary with a new word spelled h-y-p-o-i-d. Hypoid gears in many cars make it pos-



COUNTING DUST

MICROSCOPY-PUBLIC HEALTH

Dust Shows Up Like Stars Under Modern Instrument

See Front Cover

NEWEST tool of science to detect conditions causing such diseases as silicosis is a special dust-counting microscope. With this it is hoped to attain more knowledge in the field of industrial health.

The illustration on the front cover of this week's SCIENCE NEWS LETTER is not a view of the heavens as seen through a telescope, but the dust in air man breathes as viewed on the darkfield background of the new instrument, which was developed by the Bausch and Lomb Optical Company. Each square in the reference microscope screen is thirty microns across, or about one ten-thousandth of an inch.

On this page is shown the instrument in use. The piston plunger mechanism sucks in air samples and traps them on moistened microscope slides.

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sible to keep the general low height of the floor and yet, at the same time, make it level.

If your new car has a hypoid gear, you will talk about it. If it does not, you will probably find yourself arguing why a two-piece, three-joint propeller

shaft is better than hypoid gearing to obtain the floor leveling.

Without going into the intricate mechanical characteristics of the new hypoid gears it should be pointed out that they are new only in the sense that they are finding wider use in motor cars to transfer the power from the engine, through the propeller or drive shaft, to the rear wheel axles. In technical design, they are a compromise between a spur- and a worm-type gear.

Another factor which brings them to the forefront of motor car news this year is that they are one way to solve the level rear floor problem because they make it possible to bring the drive shaft into the rear end at a lower level.

A third point, and the one which offers the greatest possibility for discussion, is that they go definitely into the field of extreme lubrication pressure—and there you have a problem which has made the hairs of the petroleum engineers turn considerably more gray.

The clearances in hypoid gears, it should be explained, are somewhat less than those in the older-style gears and their size is materially reduced. The result is that pressure on the grease to be used in lubricating them is much greater than ever before.

Soap Gives Strength

No simple refined mineral motor oil or grease has the strength needed to withstand, for long, the extreme pressures encountered but research has discovered that by adding minute traces of suitable chemicals the strength can be increased 200 per cent and more. Chlorine and sulphur compounds and certain types of lead soaps are among the materials added to motor oils to gain strength.

In tests on extreme pressure lubricants at the National Bureau of Standards in Washington, some of the oils have withstood a load capacity of 250,000 pounds to the square inch and with the equipment used were impossible to break down. The conditions of the tests, however, did not duplicate the higher temperatures which are encountered inside the rear end gears and which can bring about chemical changes in the lubricant used. And it is chemical change which may bring corrosion problems, the bugaboo which keeps automotive engineers awake nights.

At first a difficult development problem, the matter of lubricating the hypoid gears is being ironed out. But the goal of being able to drive into any gasoline service station and giving the simple order, "grease the rear end," is not yet quite possible. Check with the manufac-

turer of your new car to see what brand of extreme pressure lubricant he recommends, and see that you get it.

As an alternative method of making the rear seat floor level without going to hypoid gearing, some manufacturers are using two-piece propeller shafts with three joints in them.

Whether this method is preferable to hypoid gearing is a question which can better be answered a year from now. But the dual systems indicate that there is a difference of opinion on the matter at the present time.

Overdrive, which came into use on the lower priced models of 1936, is here to stay, apparently. The automatic units which decrease engine revolution at 35, 40 or 50 miles per hour speeds received wide customer acceptance last year.

The 1937 cars in the same price class of 1936 will be larger but this has been achieved without increased weight. Refinements in carburetors, manifolds and other places enable the manufacturers rightly to emphasize greater economy of operation.

It may be an exception but it may be a trend that one make of car this year features dual carburetors to gain better distribution of the gasoline to the cylinders. In the same category is the use of superchargers in another production line of cars.

In electrical equipment, both the generator output and the battery capacity have been increased. This trend continues from previous years and began with the use of automobile radios with their extra drain on the battery.

Improved cooling of the engine is generally achieved. Some cars have lowered the speed of their water pump but circulate more water which may be more than 2,600 gallons an hour, at engine speeds of a mile a minute.

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GEOGRAPHY

Icebreaker Discovers New Island in Arctic

A HITHERTO unknown island was discovered in the icy Arctic Ocean by scientists aboard the icebreaker *Sadko*, Prof. R. Samoilovich, head of the expedition, reported. The new land is over a mile long, lying low in a large expanse of shallow water. Its position was determined as north latitude 81 degrees 12 minutes and east longitude 72 degrees 20 minutes. It is east of Franz Joseph Land.

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ORNITHOLOGY

Birds Fly North and South But Which Way Is Home?

By FREDERICK C. LINCOLN,
U.S. Bureau of Biological Survey

ARE the birds flying home now, when they go south in autumn? Or is home where the nest is built in the north in spring? There are two opposing theories as to where birds are really at home.

One theory has it that the ancestral home of the birds must be the northern one. According to this view, birds used to swarm over the whole Northern Hemisphere, and as the climate offered them a year-round food supply and suitable breeding conditions, they did not roam, as so many do now. They were like birds in the tropics today, for most tropical birds do not migrate.

But gradually an Ice Age crept down from the Arctic, bringing glacial cold and driving the birds farther and farther south until they were safe in the tropics. When the ice sheet retreated, the birds tried each spring to return to their ancestral homes in the north, but they could stay only a brief time and then winter would freeze up the home land again. So in time migration became a habit.

The other theory, suggesting a southern home for the birds, is simpler in some ways. It assumes that the birds all had their ancestral homes in the tropics. But that led to over-population and all the worries of congestion and food shortage and struggle against neighbors—just the same with birds as with humans.

So, like human immigrants, various groups of birds took to their wings and moved to breeding grounds where competition was less keen. When they flew so far north that they encountered ice sheets, or that winter cold repelled them, the birds retreated south again. In time, the migration became a habit, just as the other theory presupposes.

As yet, neither theory is supported by positive biological data. One fact we can be sure of. And that is that birds began migrating to find their two main requirements—breeding grounds and food.

The spring flight carries migrating birds to their breeding ground. The autumn flight carries them to a safe food supply. But which way is home to the birds we don't know, and I am sure the birds don't know now, either.

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MEDICINE

Chemical Warfare New Hope In Battle Against Disease

Virus Diseases Cannot Be Fought as Bacteria Infections Are; New Weapons Must Be Developed

PREVENTION or control of diseases like infantile paralysis, influenza, and others caused by viruses may soon be achieved as a result of recent research. This optimistic opinion was expressed by Dr. Ernest W. Goodpasture of Vanderbilt University Medical School at the meeting of the American Public Health Association.

"It is not too much to expect very soon," he said, "the introduction into practical prevention of new and more effective methods of control of this great group of infective disorders."

Dr. Goodpasture used as an example of these newer methods the alum-picric acid spray for the prevention of infantile paralysis which was tried out on a large scale during the outbreak of the disease in Tennessee, Alabama and Mississippi this summer. How effective this nasal spray is cannot be told at present, but the method is a step in the right direction, it appears from Dr. Goodpasture's discussion.

He explained that virus diseases cannot be fought in the same way that scientists have learned to fight diseases caused by bacteria, such as typhoid fever and diphtheria. Scientists have been able to fight such diseases successfully by sending reinforcements to the body's own disease fighters, the antibodies produced by body cells in response to bacterial invasion. This is the strategy of vaccination, serum treatments and the like. The fight against virus diseases, it appears, will have to be advanced by chemical warfare.

Inside Cells

The reason is that the virus takes a different line of attack from bacteria. The viruses, whether they are living or not, can only multiply and cause disease when they get inside the cells of the body. This is true of some bacteria, but many of them can live and multiply as well between the cells as inside them. Many viruses, in addition to requiring the environment within the cells for multiplication, have a special predilection for nerve cells. This means that in the cases of infantile paralysis, for

instance, the virus enters the nerve cells without ever coming in contact with the fluid between the cells that contains the body's disease-fighting antibodies.

This is where the chemical warfare may prove effective. The alum-picric acid spray is designed to create a barrier through which the virus cannot pass into the nerve cells. Another piece of chemical strategy suggested by Dr. Goodpasture would be to inject into the body chemicals that would make the nerve cells unsuitable for the growth of viruses once they got in.

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BACTERIOLOGY

New Cold-Loving Bacteria Spoil, But Not Sour, Cream

A NEW bacterium which spoils milk and cream without souring it has been discovered and is being investigated at Rutgers University, under the direction of Drs. J. A. Anderson and J. B. Allison.

This bacterium is very unusual in that it spoils milk and cream rather rapidly at temperatures just above the freezing point and fails to grow at body heat. As a matter of fact, the bad flavor is conspicuous only when the bacteria are grown in cream in the refrigerator instead of the usual warm cupboard.

The organism seems to act only on fats, producing a bitter taste and irritation to the throat, "like the beginning of a sore throat," which can be duplicated very closely by adding certain products of broken-down fats, the fatty acids, to pure milk.

This new germ can cause no harm beyond making foodstuffs taste badly, but since it can live in a refrigerator it creates a difficult problem for dealers in foods which it is undesirable to pasteurize.

The organism was first discovered in a lot of cream brought to Dr. Anderson by a local dairyman for examination. It was later found in water of wells a thousand feet deep, driven deep into rock and sealed with concrete.



NEW GERMS

Newly discovered cream - spoiling germs, that can grow at temperatures just above freezing. They give refrigerated cream a bitter, nasty taste without any warning change in its appearance. Photomicrograph shows them enlarged 1,500 times.

The organism, Dr. Anderson found, looks like a series of very short rods held together end to end. Besides growing at remarkably low temperatures, it is unusual in that it uses up the fat and produces a disagreeable taste without any change in the appearance of the bottle of milk or cream. It seems to attack only fats, never solutions of sugars or starches to which it is added.

"The organisms are a unique kind; they do things bacteria rarely do," summarized Dr. Allison. "The investigation of what they do and how they produce changes at temperatures where most living things are inactive should be very valuable."

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PSYCHOLOGY

Eccentricities in Art Blamed on Eye Defects

MOST persons who are nearsighted or have astigmatism get themselves eyeglasses to correct the visual defect and go unhampered about their business. These rather common defects, however, are held responsible for some of the vagaries that puzzle the ordinary viewer of modern art.

How nearsightedness or astigmatism in the artist's eyes can make him draw or paint pictures that look queer to the rest of us is explained by a Los Angeles eye specialist, Dr. Lloyd Mills (*Archives of Ophthalmology*, August.)

What we see, he explains, is a combination of images produced by the central part of our eye-lenses and the peripheral or outer parts of them. In

order to draw a picture of things as we see them, the artist must preserve the normal proportions of these two kinds of sight in his drawing. If visual defects prevent his doing this, he may paint beautiful pictures of the impressionistic type, or he may paint those which look "queer" to normal eyes.

Dr. Mills first became interested in the effect of eyesight on art when an artist came to him for treatment. This man produced paintings which were remarkable for fine use of color, but the drawings were sometimes distorted. This turned out to be due to astigmatism, but unfortunately, when glasses were supplied that corrected the astigmatism, the artist had trouble in getting

the color effects with which he had previously had so much success.

Short-sightedness, a condition found particularly among the educated classes, is especially frequent among artists, and has much effect upon their drawings. In short-sighted individuals, the acuity of vision with the central part of the eye is decreased, and they are forced to use that of the edges of the eye. This, thinks Dr. Mills, accounts for the work of Cezanne, Renoir, Gordon Craig, and George Grosz, the cubist. Pissarro had repeated abscesses of the cornea of the eye, and Van Gogh and Gauguin had mental diseases, which accounts for the eccentricities of their drawings.

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ARCHAEOLOGY

Find Indian Mound Built Since the White Man Came

Skull of Horse Imported by White Man Dates Important Find in Wisconsin; Left by the Dakota Sioux Tribe

A HORSE'S skull, hidden for two centuries in an Indian burial mound in Burnett County, Wisconsin, has established the first known case anywhere of mound building by the Dakota Sioux Indians.

Discovery of an Indian mound built since the white man's coming to America is a rare archaeological event. Almost all of the remarkable Indian mounds found up and down the Mississippi Valley are the work of prehistoric Mound Builders, whose ancestral relationships to well-known historic Indian tribes are very hard to trace.

The horse's skull was unearthed by a University of Wisconsin-Milwaukee Public Museum expedition which recently returned after two months of exploration among mounds in Burnett and Barron counties.

Announcing the discovery, the director of the expedition, W. C. McKern, curator of anthropology at the Milwaukee Museum, said it was the most important archaeological development in Wisconsin in seven years. The mound in which the skull was found is the only one ever excavated in the state that can be traced definitely to a particular Indian tribe, Mr. McKern said.

Mr. McKern based his conclusions on the horse's skull.

The mound could not be older than

250 years, Mr. McKern said, because previous to that time the Wisconsin Indians had no horses. It couldn't be less than 200 years old, he reasoned, because no trinkets, beads, or other

trading materials used by the white men were found. Therefore Dakota Sioux Indians must have built it. They were the only inhabitants there during that period.

To further substantiate this conclusion, Mr. McKern pointed out that the pottery and arrow heads found in the mound correspond with those found in known historical Sioux Indian village sites.

Near the mound, the expedition found vestiges of an old Sioux village. The area is now under cultivation, but the expedition found pieces of pottery, small stone implements, arrow heads and general village refuse.

The mound on the shores of Spencer Lake is 70 feet in diameter and 13 feet high. In the pit and four layers of burials the diggers found bones of 175 Indians. The burials were secondary, that is, bodies had been placed in trees or on scaffolds until flesh decayed and then the bones were gathered and buried in the mound. This was an ancient custom among certain tribes.

Identifying these Mound Builders is a valuable contribution to study of early residents of this region. It is, however, scarcely a start toward piercing the darkness that envelops prehistoric peoples of the state.

"Men have inhabited Wisconsin for thousands of years, yet science knows virtually nothing about them before 300 years ago and very little prior to 200



HORSE GIVES PROOF

If any romantic Americans still cling to a belief that Mound Builders were mysterious ancients—not Indians—this horse's skull should convince them to the contrary. The skull has been dug from an earthen mound in Wisconsin shown on the facing page.



MODERN MOUND

Bones of 175 Indians, their pottery and arrowheads, were found in this mound and reveal that Dakota Sioux were among the mound building tribes. They continued the custom into historic times.

years," Mr. McKern said. "Mounds in northwestern Wisconsin are treasure beds of information about those who once lived there."

The last previous great archaeological discovery made in Wisconsin, Mr. Mc-

Kern said, was the revelation seven years ago that Indians of the Hopewell culture, so called from the famous Hopewell Mounds in Ohio, built mounds as far north and west as Wisconsin.

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COMPARATIVE ANATOMY

Rudiments of Speech Center In Brains of Highest Apes

Orang-Utan, Gorilla, and Chimpanzee Show Distinctive Furrows in Cortex But Not Developed as Are Man's

BRAINS of the three highest apes, orang-utan, gorilla, and chimpanzee, show beginnings of a part of the structure that controls speech. It is not found in the brain of any other kind of ape or monkey.

This is among the results of an exhaustive study of the large collection of primate brains at the U. S. National Museum, carried on by Dr. Cornelius J. Connolly, professor of physical anthropology at the Catholic University of America (*American Journal of Physical Anthropology*, October).

The Museum collection of brains, accumulated during many years by Dr.

Ales Hrdlicka, afforded Dr. Connolly unique opportunities in his study. Many earlier generalizations about the brain structures of ape and monkey species had been founded on the examination of a single brain, whereas Dr. Connolly was in most instances able to compare several brains of any given species. He was thus in position to correct a number of pre-existing errors.

The power of speech is believed by many neurologists to be centered in a particular part of the forebrain cortex known as Broca's area. It is marked off from the rest of the brain by definitely located furrows or depressions which

anatomists call the inferior frontal sulci. These particular furrows or sulci appear first on the forebrain of the orang-utan, which is in some respects a less-evolved ape than the gorilla and the chimpanzee. The speech area is of course found in the latter two apes also, and in them it shows somewhat greater development.

The possession of rudimentary speech centers by the three great apes must not be taken as an argument that they possess the true mechanism of speech, Dr. Connolly warns. No conclusive evidence has ever been produced, he says, that these animals have even the beginnings of speaking ability. So far as present scientific knowledge goes, man is the only talking animal in the world. And in man's brain, it might be mentioned, the speech area is much more highly developed, with structural features not present in the highest apes.

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ARCHAEOLOGY

Incas Had Pet Bulldogs Designs on Vases Show

THERE were bulldogs in ancient America, kept as pets by the Incas of Peru. (*Antiquity*, September.)

German archaeologists have proved this by vases, which they unearthed in Peru, adorned with realistic figures of dogs. The animals have the large head, divided lips baring the teeth, the dished-in nose, all reminiscent of the English bulldog, and the stiff batlike ears of the French dwarf bulldog.

The American breed developed entirely separately from the European bulldogs, and has become entirely extinct.

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DENTISTRY

Glass for False Teeth Is Strong, Good Color

PROGRESS in the use of glass as a base for false teeth is reported by Dr. Frank Lott of Toronto to the American Dental Association. (*Journal*, October.) Prime advantage of the glass base is its more natural color which matches satisfactorily the gum tissues of the majority of patients. The color is lasting, another advantage. The glass is strong enough to stand considerable pressure, as in chewing, and when it does break from being dropped when the patient has his false teeth out of his mouth, it is easily repaired. Dr. Lott hopes that this disadvantage can be overcome by shatterproofing.

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BACTERIOLOGY

Air-Borne Bacteria May Show Direction of Wind

WEATHER men studying the origins and migrations of air masses may have to add bacteriology to their other techniques, if heed is given to a suggestion by Drs. Claude E. ZoBell and Helen M. Mathews of the Scripps Institution of Oceanography. They have conducted quantitative studies on the proportions of land and sea bacteria in breezes blowing both offshore and onshore. (*Proceedings, National Academy of Sciences*, October.)

Land breezes carry preponderant numbers of soil bacteria, they found, while breezes from the sea have a higher ratio of saltwater organisms. Not more than five per cent of soil bacteria can live in a saltwater medium. While a somewhat larger proportion of oceanic bacteria can survive living conditions like those of inland soil, a large ratio of such organisms in an air mass of unknown origin would seem to indicate that it had traveled over the sea.

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NUTRITION

Feed Cows Lemon Juice In Study of Milk Flavor

THE EFFECT of vitamin C in cows' feed on the susceptibility of milk to oxidized (unpleasant) flavor, when the milk was contaminated with small amounts of copper such as are likely to come from utensils and equipment, has been investigated by Prof. L. M. Thurston, W. Carson Brown, and R. B. Dustman at West Virginia University. The following results were obtained:

The feeding of vitamin C rich foods materially reduced or entirely eliminated the susceptibility of the milk to oxidized flavor even though the milk was contaminated with copper.

The vitamin C content of the feed was increased by use of tomato juice, lemon juice and pure finely crystallized vitamin C (Cebione).

The presence of vitamin C in the ration from the above sources had no unpleasant effect on the natural flavor of the milk.

It is the belief of the authors that pasture grasses probably contain vitamin C or some similar substance which is responsible for the non-susceptibility of milk from cows on pasture to oxidized flavor development.

The development of oxidized flavor may be prevented in two ways: (1) The elimination of all sources of copper contamination and, (2) the feeding of vitamin C rich foods in the winter ration.

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PUBLIC HEALTH

Local Health Officers Can Fight Mental Disease

PEOPLE of all ages and in all walks of life may need help in protecting themselves from mental ill health, Dr. B. Liber, New York City psychiatrist, indicated. He pointed out that preventing mental disease is as much a problem for public health agencies as preventing smallpox or other physical disease.

Cooperation of trade unions and of employers should be gained by health officers in order to protect the mental health of workers, Dr. Liber said. Employers should learn that it is to their own advantage that the workers be clear-minded, alert and calm in order to prevent accidents and to produce more and better quality work.

"Child upbringing, sexual problems in youth, marital problems and industrial difficulties constitute the worst causes of mental maladjustment," Dr. Liber said.

Other methods by which health departments can protect mental health as suggested by Dr. Liber are the following:

1. Preventive mental clinics for transition cases of adults.
2. Mental hygienists in all elementary public schools.
3. At least one mental examination of all pupils.
4. Behavior problems solved in co-operation with parents.
5. More attention to mental hygiene in schools for teachers.
6. More and better Child Guidance Clinics.
7. Easy courses in child upbringing for parents and future parents, preferably in public school buildings.
8. Marital consultation bureaus, not compulsory, but friendly, sympathetic and confidential for young men and women before marriage. Discouraging unions between families where insanity or feeble-mindedness prevails. Discovering gonorrhea, syphilis, tuberculosis in candidates for marriage.
9. Classes for adolescents in sex education. Dispelling fears and anxieties due to ignorance and leading to mental maladjustment.

Science News Letter, November 14, 1936

IN SCIENCE

BACTERIOLOGY

Plant Disease Germ Related To Bacteria in Humans

A DEFINITE connection between the *Bacillus coli* found in the large intestine of man and the bacteria causing delphinium blight, rot of dahlia and carrot rot has been brought to light by the research of the WPA unit in the New York Botanical Gardens.

These conclusions are presented in graphic form at the series of exhibitions held by the Women's and Professional Division of the Works Progress Administration in various New York City armories.

Through work on these plant diseases the organisms causing the diseases have been isolated and it has been found that they are identical in both structure and reaction with the *Bacillus coli* which may cause disease in man, though it is ordinarily harmless.

Research is now under way to prove whether or not these organisms causing plant disease will produce human disease.

Science News Letter, November 14, 1936

PHYSICS

Returns From Stratosphere Flight Still Coming In

THE STRATOSPHERE flight of 1935 by the National Geographic Society-U. S. Army Air Corps is still yielding information for science, it was revealed at sessions of the American Physical Society by Drs. Brian O'Brien and H. S. Stewart of the University of Rochester and Dr. F. L. Mohler of the National Bureau of Standards in Washington.

Newest feat is to make a determination of the distribution of the ozone in the earth's atmosphere more than a mile above the 13.6 mile ceiling reached in the actual ascent.

It appears that at the stratosphere balloon ceiling at 22 kilometers (13.6 miles) there was a sharp concentration of ozone, and that at 24 kilometers (14.9 miles) the concentration fell to half its value at the 22-kilometer level.

Science News Letter, November 14, 1936

EN FIELDS

BIOLOGY

Plants' Food Making Slowed by Heavy Water

HEAVERY water, containing double-weight hydrogen atoms instead of the common, single-weight ones, slows down the food-making process in green plants, Drs. James Curry and Sam F. Trelease of Columbia University have found.

They kept colonies of a one-celled green plant in practically pure heavy water, and parallel colonies in similar amounts of ordinary water. The heavy water colonies carried on photosynthesis, or primary food production, only about two-fifths as rapidly as those in the common water.

In another experiment, in which Dr. Robertson Pratt also participated, doubt was cast on the ability of heavy water to have any noticeable physiological effect on plant activities. Two kinds of fungi, and wheat at two different stages of early growth, were subjected to the action of the dilute heavy water, but no effects were noted.

Science News Letter, November 14, 1936

ARCHAEOLOGY

Offerings of Pagans Show Changes in Religion

GIFTS left by pious pagans at a holy place on the Thorsberg Moor near Kiel have been dug up in huge quantities by archaeologists working under the direction of Dr. Herbert Jankuhn of the Museum of Prehistoric Antiquities, in Kiel. (*Forschungen und Fortschritte*, October 10.) This spot was a sacred place for several centuries, both before and after the beginning of the Christian era, and the succession of gift-types yields a graphic picture of an evolution in the pagan religion in ancient North Germany.

Oldest are large numbers of earthen pots, in which the devotees set out gifts of food—meat, nuts, butter, etc. Then there are considerable numbers of bronze objects, like sword ornaments and cloak pins. Finally the number of gifts becomes much diminished, but their value greatly enhanced, for most

of them are of gold. Inscribed gold rings were apparently the favorite offering in this late stage of the cult's development.

It is still difficult to determine what gods were worshipped on the Thorsberg Moor, but the scanty and almost undecipherable runes and occasional images on the rings hint at Thor, the war-god Tiu, and a god named Ull, who presided over winter, skiing, and archery.

A trace of the ancient cult still survives in a market fair regularly held at Nordmark, which is under the auspices of a church instead of the civil authorities as is customary elsewhere.

Science News Letter, November 14, 1936

SEISMOLOGY

Quake off Japanese Coast On our Election Day

TOKYO'S sharp earthquake that came on America's election day (Tuesday, Nov. 3) has had its epicenter checked up by American seismologists of the U. S. Coast and Geodetic Survey, on the basis of data collected by wire through Science Service. The point of greatest disturbance was calculated as in latitude 37.5 degrees north, longitude 142 degrees east. Time of origin was 3:45.9 p.m., eastern standard time, or 5:46 a.m., Tokyo time.

Stations reporting were: Georgetown University, Fordham University, Canisius College, the University of California, the private observatory of Mrs. M. M. Seeburger, Des Moines, Iowa, the Philippine Observatory, the Dominion Meteorological Observatory at Victoria, B. C., and the observatories of the U. S. Coast and Geodetic Survey at Tucson, Ariz., and Honolulu, T. H.

Science News Letter, November 14, 1936

ARCHAEOLOGY

Probe 13th Century Russia In Digging at Ukraine

A MEDIEVAL Russian town of the eleventh to thirteenth centuries is being excavated west of Kharkov, in the Ukraine region. Digging has already revealed many homes and the shops where crockery and bone articles were made.

Weapons used in that feudal age are so numerous in the ruins as to give a complete picture of the military technique. Especially well preserved are iron spears, axes, knives, daggers, and sabers.

Science News Letter, November 14, 1936

ENGINEERING

Rust Brothers Invent Improved Cotton Picker

A GREATLY improved, more efficient cotton picker is revealed in two U. S. patents (Nos. 2,058,513 and 2,058,514) just granted to the famous Rust brothers, Mack D. and John D. Rust of Memphis, Tenn., whose invention and testing of a cotton picking machine to do the work of a hundred human pickers recently stirred the country.

The new cotton picker described in the patents, strips cotton even from the unopened bolls of the cotton plant. It has a "mechanical gleaner" on it, which salvages any dropped cotton. It is more compact so that it can get between narrower rows of cotton plants.

It has a device for directing and manipulating the cotton plants so that the picking spindles will strip the plants for the maximum amount of cotton. It can be operated at maximum speeds to suit the type of field being picked. The faster the machine moves the faster the pickers pick. It does not clog up or jam.

These are some of the advantages which are claimed in the patents for the newest Rust brothers' cotton picker.

Mounted on a tractor, it consists of two picking units, one on each side of the operator, so that when the machine moves down the field it straddles two rows of plants at a time, picking them simultaneously. Just as the cotton plants enter the throats of the picking units, they are grabbed between the jaws of a boll crusher. This bursts any unopened bolls to expose their fleecy cotton to the picking spindles.

Then into the tunnels of the pickers proper pass the plants where a screen cylinder guides them into intimate contact with moist, rapidly whirling spindles, which like hungry fingers pick the cotton from the bolls.

As the tractor continues to move over the rows of cotton, the cotton-laden spindles move out of the tunnel to be stripped of their cargo, while stripped, remoistened spindles take their place. New cotton plants pass into the throat of the tunnel while the picked plants make their exit.

To glean any cotton that may drop off the pickers, there are two separated troughs between which the plants pass. With this new feature, cotton cannot spill over onto the ground. Instead it drops into the troughs where conveyors carry it to suction pipes, which suck the cotton up and send it to huge bags.

Science News Letter, November 14, 1936

AGRICULTURE

First Farmers

Were They in Egypt, or Did Agriculture, Foundation Of all Civilization, Originate in the Americas?

By DR. FRANK THONE

IS CIVILIZATION older in America than it is in the Old World? Were there temples and cities in Mayaland and Peru before men built such mighty works in Egypt and Babylonia? Did Indian farmers raise crops of corn and tobacco centuries earlier than white and yellow cultivators had harvests of wheat and rice and grapes?

The very idea is upsetting to all the orthodox ancient history we learned, back in high school days. Civilization originated in Egypt, or maybe across the way in Mesopotamia—the book was a little vague about that. The native American cultures of Mexico, Yucatan, and the South American highlands were assumed to be considerably later. Anyway, they didn't count, because they couldn't be fitted into the nice sequence of Greece, Rome, the Middle Ages, and Modern Times. They were pretty much a side issue, unimportant because the unmannerly Spanish *conquistadores* had "destroyed" them.

But history changes as the world grows older and scholars dig more carefully into the past. We now know of other centers of culture in the Old World, older perhaps than Egypt. More important still, we have learned a great deal more about the early native civilization of our own continent, that in spite of its supposed "destruction" contributed important and lasting elements not only to the composite culture that has grown up in modern America, but has made its effects felt in the Old World, too—even in deepest Africa and the heart of Old China.

Oldest Agriculture

Even the naive earlier teaching acknowledged American sources of a number of important crop plants—potato, corn, tobacco, beans—and of such drugs as cocaine and commodities like rubber. But now comes the really revolutionary suggestion that the whole business of agriculture, which is the foundation of all civilization, may be older in the Americas than it is in the Old World.

As yet, the idea is no more than a suggestion; those who offer it have not

even called it a formal theory. But it has had the sponsorship of two distinguished and careful botanists, who are not given to loose speculation, so that it at least rates respectful attention and further examination.

One of these scientists is Dr. Merle T. Jenkins of the U. S. Department of Agriculture, specialist in the breeding and improvement of corn. Writing on his subject in the new Yearbook of Agriculture for 1936, he says:

Corn Most Ancient

"If we may judge from purely botanical evidence, corn is probably the oldest of cultivated cereals, if not of all cultivated plants. In its present form it is totally unsuited to exist in the wild. In order to reach its present condition of apparent helplessness from the standpoint of self-perpetuation, corn must have been grown by human beings ever since it has been enough like the present plant to be classified as corn. The time required for corn to reach its present development cannot be estimated with any accuracy, but it must have taken many thousands of years."

For many thousands of years, there-

fore, there must have been corn-raising farmers in America, for there must be a well-developed agriculture, capable of producing a surplus of food for city dwellers, before there can be any cities. The tremendous pyramids of Mexico, greater than the greatest pyramids of Egypt, were piled up by human muscles that got their strength from corn, just as the Egyptian pyramids were similarly muscle-founded on the wheat-and-barley surpluses piled up by the farmers of the Nile. And far to the north, the great earthen pyramids and other monuments which we call Indian mounds were reared by corn-raising tribes, who learned their agriculture from the older and more advanced cultures in the warmer lands of Mexico. And it must have taken a long time for this information to diffuse over such great distances; for that was before the days of rapid publication and travelling scholarships and exchange professors from other universities and experiment stations.

Many Others

But corn was not the only indefinitely ancient thing the pre-Columbian Indians had on their farms. Dr. E. D. Merrill, professor of Botany at Harvard University, called attention to a whole series of other crop plants originated from native American wild sources, in



FROM OLD WORLD

Built by wheat eaters: the famous "step pyramid" at Saqqara, Egypt.



FROM NEW WORLD

Built by corn eaters: the great "stepped" Pyramid of the Sun, at Teotihuacan, Mexico, is larger than any of the pyramids of Egypt.

an address at the recent Harvard Tercentenary celebration. He gave a most impressive catalog: corn, potato, sweet potato, all varieties of field and garden beans, tomato, pepper, sunflower, Jerusalem artichoke, squash, pumpkin, arrowroot, peanut, tobacco, pineapple, avocado, and a score of tropical fruits which we North Americans scarcely know even as names.

Botanical Orphans

Some of these, particularly tobacco and several kinds of beans, are "botanical orphans" like corn; that is, they are known only in cultivation. Their wild ancestral forms have never been found. Either these crops have been under cultivation so long that the ancestral wild species have become extinct; or they have been changed so much that the wild forms, if existent, are not recognizable as relatives; or the wild forms exist only in some obscure, out-of-the-way spot that explorers have never discovered. But any of these three alternatives requires a great deal of time for the development of the cultivated forms to their present state, and for their distribution all the way from Patagonia to Canada.

Contrast this collection of highly developed "orphan" plants with the cultivated plants of Europe, Asia, and Africa. You are at once confronted with the startling fact that all of the important Old-World crop plants—wheat, rice, oats, barley, rye, apples, pears, cherries, etc.—have easily recognizable wild-ancestral relatives still living in the old ancestral homes. Plant breeders still go into those lands to study the wild forms, and to get seed for hybridizing purposes. That cannot be done for the American plants. It constitutes the strongest support for the idea that Amer-

ican agriculture is so old that its wild ancestral species are clear out of the picture.

Moreover, this "civilization" of native American wild plants, unknown hundreds or thousands of years ago, took place in a few places only—very likely in or near the areas where arose the great Indian empires which the white men found when they came: the Mexican and Andean uplands, and Central America. For the Indians of our more northerly lands used as cultivated plants only the things they had received from the Southwest: corn, tobacco, pumpkins and squashes, beans. They did not tame a single wild plant native to temperate North America, though later-coming white men found at least a few of these worth the trouble: the eastern grapes, blueberries, cranberries, and raspberries. Our Indians were satisfied with the "alien" crops, just as white men were when they found them.

Few Animals

In odd contrast to the ancient Indian farmers' success with plants is his exceedingly limited list of domestic animals. The dog he brought with him when he arrived from Asia as a hunting nomad; and the dog was literally the only importation from the Old World, either animal or plant. As he established himself as a settled agriculturist in the new land, he acquired exactly three domestic animals: the turkey in Mexico, and the llama and the Muscovy duck in the Peruvian region.

This may be due partly to the unsuitability of most American animals for domestication: bison, antelope, deer, elk, bighorn, and similar animals all existed in the Old World, too; and nowhere in the Old World did prehistoric man ever tame them. They are probably

simply unsuited to domestication. And the Indian's ancestors did not find here the more tractable and domesticable of Old-World animals, like cattle, horses, sheep, swine, poultry. So in taming only three American animal species, the primitive New-World farmer was probably doing all he could with available materials.

Hunters

Prof. Merrill stressed the fact that America's first immigrants were not farmers. They brought neither seed nor knowledge of farming with them. They were savage hunters, having only their dogs. All their agriculture, which reached such a high state of development, was worked out of their own resources of intelligence, as brought to bear on the food plants which they found here. First they gathered and ate them as they came upon them in fields and woods, later on they learned how to plant and tend and harvest them, for a more bountiful and dependable supply. And living with them year after year, they slowly improved them, until they had several varieties apiece of the more important ones, particularly their one grain, corn.

A Riddle

That riddle of corn's origin continues to intrigue botanists in spite of its unsolvability—or perhaps just because of that. There is one wild relative of corn, native to southern Mexico and Central America, that persistently gets into their eye: teosinte. Teosinte is a tall, rather coarse-stemmed grass with corn-like leaves and tassels, and corn-like husks around its seed-clusters.

But that is as far as it gets. Those seed-clusters are as unlike real corn-ears as you could imagine in a half-day's hard trying, and the seeds themselves, angular and hard and flinty, are utterly unfit to eat. Yet, it has been pointed out, the shift of a single mendelian factor would remove that flintiness and make the seeds into tolerably grindable grains. Did some archancestral red-skinned farmer, by a lucky break, find such a soft-seeded teosinte mutant, realize the importance of his discovery, and carry on the line? It is a tantalizing speculation.

Another important line of evidence for the real antiquity of American agriculture is the high technical development it had achieved. Though it started from scratch, under the crude hoes and planting-sticks of savages who had to teach themselves everything, it had all the essential elements that mark success-



AN OLD STORY

Very ancient Peruvian vase representing the corn god, decorated with four ears of corn.

ful agriculture everywhere: preparation of the soil, destruction of weeds, use of fertilizers, terracing in steep terrains, irrigation in dry areas, development of special varieties and strains of plants through selective breeding. These things take time, and lots of it.

Some speculative souls, fascinated by certain parallels developed independently by American and Old-World cultures, have tried to trace a common origin through the mythical "lost continents" of Atlantis or Mu. For these suggestions Prof. Merrill has scant patience. If there ever had been a mass emigration from some old, high civilization, in a land that now lies beneath the ocean, it would be only reasonable to expect that the migrants would have driven their flocks and herds before them, and would have carried stocks of seed to plant in the Promised Land of their exodus. But what do we find? Native man in America had but one animal of Old-World animals, the dog—exactly what a nomad hunter would be expected to have along with him. He had no Old-World flocks and herds at all, and not a single Old-World crop plant of any significance. There was not one American plant in Europe, Asia or Africa until Columbus and his successors brought them; not one Old-World crop raised in America until European colonists brought the seed in.

The evidence, then, seems overwhelming: agriculture, and the civilizations dependent on it, was developed along somewhat parallel lines in the two hemispheres, but in each independently of the other. And with its array of "orphan plants" in cultivation, Amer-

ica seems to have at least an admissible claim to the honor of having started farming first.

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Science News Letter, November 14, 1936

PUBLIC HEALTH

Russians Trace Tularemia Outbreak to Infected Water

AN EPIDEMIC of rabbit-fever in Siberia has taught scientists that water can carry the dread tularemia infection, Drs. S. I. Karpoff and N. I. Antonoff of the Institute of Epidemiology and Microbiology report (*Journal of Bacteriology*, September).

Engaged in harvesting wheat, a whole community of farm workers took up residence in a field "between the cities of M. and T." As drinking water they used that from a river and from a small brook which emptied into it below the point where the river water was obtained. A few days later a large number of cases of a disease which resembled somewhat the plagues of the Middle Ages broke out among the farmers. In all cases there was swelling of the glands about the mouth and throat, the liver "stood out the thickness of a finger's breadth," and the spleen was swollen and sensitive. The doctors diagnosed the disease as rabbit-fever, but were puzzled about how it could have been spread.

In the United States doctors had discovered the disease to be spread by infected rabbits; in Norway the wild rat was the culprit, while in Russia water

rats were guilty. But in this epidemic only a few rats had been seen, and the doctors knew definitely that the affected people had picked up the disease from something eaten or drunk.

Then another fact became apparent. Those who had drunk unboiled water from the brook became ill, but those who drank similar water from the river were quite healthy. Bacteriological analysis solved the problem. The brook water was loaded with tularemia germs, that from the river was clean.

An epidemic of tularemia, acquired from water rats, broke out in the Ural region of Russia in 1928 when a commercial demand for the water rat pelts turned the entire population to the job of catching and skinning them. A lot of infected rats may have been in the brook that was found infected with tularemia germs, although scientific investigators, one month later, did not find any rats in the brook.

Avoiding the newly discovered danger of acquiring tularemia from water is simple enough: Only water that is bacteriologically clean must be used for drinking.

Science News Letter, November 14, 1936

MEDICINE

Whooping Cough Vaccine Must be Given in Large Doses

THE SECRET of successful vaccination against whooping cough may lie in the amount of vaccine given to each child, it appears from results obtained at the experimental whooping cough clinic being conducted by WPA experts under supervision of the New York City Health Department.

The value of whooping cough vaccination has not yet been settled to

the satisfaction of physicians generally.

At the clinic a study is being made of the value of the various whooping cough vaccines used in the prevention of this disease. Within recent years whooping cough has been responsible for more deaths than any other infectious disease of childhood.

Seven different vaccines are used in the clinic upon groups of children

under six years of age, the most dangerous period in whooping cough. An equal number of children are left unvaccinated. Through periodic home visits check is made upon the children's exposure to the disease.

Results to date tend to show that, when smaller amounts of the vaccine are used, approximately the same proportion of vaccinated children contract the disease as in the unvaccinated group, but that with a marked increase of the dose only one-third as many vaccinated children come down with the disease.

A display of the clinic's work has been on view at the series of exhibitions held in various New York City armories by the Women's and Professional Division of the Works Progress Administration.

Science News Letter, November 14, 1936

PUBLIC HEALTH

Increase in Cancer Deaths Is Apparent, Not Real

THOSE who have been worrying over the menace of an increasing cancer death rate can ease their fears and take heart from the optimistic note on cancer struck by latest figures of the Metropolitan Life Insurance Company.

The increase in the cancer death rate during recent years is more apparent than real. No more people are dying of cancer now than 25 years ago, but more cancer deaths are being recorded because of better diagnosis. In certain groups, notably white women between the ages of 35 and 54, the death rate has declined significantly in the past 25 years. Only over the age of 65 has the cancer death rate for white women shown an upward trend.

These are among the findings of a survey of cancer deaths among the company's industrial policyholders during the past quarter century.

Even among white males the cancer death rate is not quite a third higher than that of 25 years ago. This increase, it is believed, is due to improved diagnosis, more cases being recognized now as a result of improvements in modern medicine during the past quarter century. These improvements in diagnosis have caused an apparently greater increase in the cancer death rate for men than for women in the 25 years, because in men cancer occurs more often in internal organs where it was not easily accessible for diagnosis.

Bearing out this point which argues that the increase in cancer deaths is more apparent than real is the fact that

the recorded death rates from cancer in accessible places have declined while those from inaccessible cancers have increased.

Other hopeful developments in the cancer situation in the United States are the growth of facilities both public and private for treating cancer and the improvement, as a result of special training, of the physician's ability to diagnose and treat cancer effectively.

Also encouraging is the fact that between 1932 and 1935 the American

College of Surgeons collected data on 25,000 patients living five or more years after treatment for cancer without recurring signs of the disease.

The true death rate from cancer may not have increased, but cancer still remains a major public health problem, the life insurance company's statistician, Dr. Louis I. Dublin, points out. Cancer ranks second only to heart disease as a cause of death, and still takes 135,000 lives each year.

Science News Letter, November 14, 1936

PHYSICS

Intense Sound Vibrations Age Whiskey in Seven Hours

SEVEN HOURS of treatment with intense sound vibrations—having the impact of mechanical blows—will produce a whiskey equivalent to one aged four years in the wood. The result of this research was announced for the first time by Dr. Leslie A. Chambers, of the School of Medicine of the University of Pennsylvania, before a meeting of the Institute of Radio Engineers, Philadelphia Section, in the Engineers Club, Philadelphia. This was only part of the research conducted by Dr. Chambers in the realm of pressure pulses, and the results of his research indicate that they will have their greatest use in the preparation of serums.

During Leave

Dr. Chambers' research on the effects of intense mechanical vibrations in the artificial maturing and blending of alcoholic beverages was not conducted at the University of Pennsylvania, but at a commercial laboratory in Boston, while on leave from the University.

The results, however, were highly satisfactory when checked by analysis. The aging of whiskey has to do with the esters and higher alcohols, as well as other factors which produce the taste and other features sought by connoisseurs. Tests showed that the whiskey exposed to the pressure pulses produced these features in seven hours against four years in the wood.

The sound vibrations used by Dr. Chambers are of a frequency of 1200 cycles per second, some two octaves above the middle "C" of the musical scale; but their intensity is equal to one hundred times that of the entire Philadelphia Orchestra playing together.

These vibrations are produced by oscillators and kindred devices.

It has been found that when fluids are subjected to these intense vibrations various changes are induced and accelerated. Particularly useful and interesting is the effect on milk. When milk is subjected to this treatment it is homogenized, as it were, and the cream will not again separate from it. The milk is also more digestible because of the effect upon the curds.

The research in the field of medicine is progressing rapidly, Dr. Chambers pointed out, and it has been shown that certain organisms are killed by these pressure pulses.

Dr. Chambers pointed out that future research in the field of intense sounds will undoubtedly lead to wide use in the sciences and industry, especially in the field of medicine.

Science News Letter, November 14, 1936

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by HAVELOCK ELLIS

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PHYSIOLOGY

NATURE RAMBLINGS

by Frank Thone



You Have Dinosaur's Bones

ISN'T it odd, how all of us are built of second-hand materials!

Man and all the lower animals are chemically very much alike in flesh and blood and bones. Even down to such lowly levels as oysters and worms this chemical kinship runs unbroken. Of devourer and devoured, even more intimately than of man and wife, can it be declared, "They two shall become one flesh."

Were it not for this transferability of materials from one organism to another, animal life could not exist. For although plants can make their own body-materials out of the raw inorganic stuffs of earth and water and air, animals must depend wholly and ultimately on plants for their building materials.

But let it not be thought that the eaters are only exploiters, with no usefulness at all in the world. If there were no animals, no fungi, no decay-bacteria, a few generations of higher plants would have all the life-necessary minerals locked up in their own bodies, and even this kind of life would have to

cease through sheer lack of anything to turn into more plant bodies. By breaking the built-up plant stuffs, the eating, destroying organisms eventually return everything to the dust and the air, so that new cycles of life can be always starting up.

Among the materials on which the closest natural economy has to be exercised are the phosphates, that form a considerable part of our bones and are necessary for the proper functioning of flesh and blood as well. More cultivated land suffers from lack of phosphates than from any other fertilizer deficiency, it is claimed.

Although the phosphate lack of farm land is met increasingly through the use of mineral phosphates from very ancient rock deposits, bone meal is still used to a considerable extent. And in nature the renewal of soil phosphates is taken care of entirely through the decay of bones and shells and other phosphate-containing animal and plant tissues.

It is highly probable that every phosphate molecule in the soil has been used over and over again, by long successions of animate life through the millions of years of geologic time. It is a fascinating speculation, to think of the procession of owners a given bit of phosphate in your fingertip-bone may have had: proterozoic ameba; paleozoic trilobite, fish, and amphibian; mesozoic saurian and primitive mammal; tertiary behemoths and pre-human primates; and most recently perhaps some of our own human forebears. You are the sum of all the ages: not merely dinosaur hash from the Jurassic, but also a nice Devonian kettle of fish!

Science News Letter, November 14, 1936

Shrimp may migrate as far as 200 miles, scientists have learned by tagging them.

RADIO

November 17, 5:15 p.m., E.S.T.
A CENTURY OF INVENTION—
Thomas Midgley, Jr., Chairman, Executive Committee, Centennial Celebration of the American Patent System.

November 24, 5:15 p.m., E.S.T.
LIGNIN—ENIGMA OF THE FOREST—
Carlile P. Winslow, Director of the U. S. Forest Products Laboratory.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.

ENTOMOLOGY

New "Farthest South" For European Corn Borer

A NEW "farthest south" has been reached by the European corn borer during the 1936 season, when the destructive larvae appeared in fields of mainland Virginia, which has hitherto been exempt from their invasion.

Although the borer did not extend the western boundary of its territory beyond last year's lines in Michigan and Indiana, its numbers along this boundary increased markedly, and entomologists of the U. S. Department of Agriculture feel considerable concern. This insect thrives best and carries on its invasion most successfully during wet weather, they explain. That it has been able to hold its own territorially and increase in numbers during a season of extreme drought is indication that it is ready to push westward rapidly next year if the season is more nearly normal.

Science News Letter, November 14, 1936

PHYSICS

Simulated Lightning Studied in Glass Tubes

ELECTRICAL impulses of 124,000 volts are racing up and down 32-foot long glass tubes at the University of Virginia in studies which scientists believe reveal new knowledge of the nature of lightning. Prof. J. W. Beams and Drs. L. B. Snoddy and J. R. Dietrich reported to the meeting of the American Physical Society that the phenomenon they have been studying "is similar to that usually observed in the lightning flash."

The electrical potentials were timed as they passed along the glass tubes with varying pressures of air present in the tubes. Velocities equal to nine-tenths the velocity of light were observed. Highest value obtained was 430,000,000,000 centimeters per second, which is about 167,000 miles an hour.

Science News Letter, November 14, 1936

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Radio

ELECTRONIC TELEVISION—George H. Eckhardt—*Goodheart-Willcox*, 162 p., \$2.50. In the last few years television has completely changed its fundamentals and is closer to realization. It has become electronic instead of mechanical. The two principal methods, being developed by Radio Corporation of America and Philo T. Farnsworth, Inc., are fully described. Mr. Eckhardt gives information that will be useful to laymen, amateur enthusiasts, and engineers. As by-products of television there have been developed secondary electron multiplication and multiplier tubes. These tubes treated in this book may have wide use beyond television and promise to be superior to the hot tubes now in use.

Science News Letter, November 14, 1936

Medical Science

LANE MEDICAL LECTURES: STUDIES IN CARDIOVASCULAR REGULATION—G. V. Anrep—*Stanford Univ. Press*, 118 p., paper, \$1.50, cloth, \$2.25. Physicians and medical scientists will be interested in these lectures by the professor of physiology in the Medical Faculty of the Egyptian University. They are, however, too technical for lay reading.

Science News Letter, November 14, 1936

Chemistry

MASTERY UNITS IN CHEMISTRY—Garrett F. Roberts and Howard C. Smith, ed. by Michael N. Idelson—*Colonial Book Co.*, 270, 28 p., paper 67c, class price 50c; cloth, \$1, class price 75c. A compact study text in high-school chemistry.

Science News Letter, November 14, 1936

Hygiene

CHANGE OF LIFE IN MEN AND WOMEN—Marie C. Stopes—*Putnam*, 239 p., \$2. Physicians will probably feel that Dr. Stopes should have presented her new ideas to the medical world before publishing them in a book for the layman and woman. There is much general advice that may help the lay reader, although the book seems to suffer somewhat from repetitiousness.

Science News Letter, November 14, 1936

Philosophy—Political Economy

SCIENCE AND SOCIETY, A Marxian Quarterly—Fall, 1936. Vol. 1, No. 1. *Cambridge, Mass.*, 35c per copy, \$1. annually. A new journal dedicated to "the growth of Marxian scholarship" and illustrating "the manner in which Marxism integrates the various scientific dis-

ciplines and illuminates the interdependence of science and society." The four leading articles of this first issue deal with education, linguistics, logical positivism, and mathematics.

Science News Letter, November 14, 1936

Pedology

SOIL SCIENCE, ITS PRINCIPLES AND PRACTICE—Wilbert Walter Weir—*Lippincott*, 615 p., \$3.50. A few years ago it was virtually impossible to obtain a text in soil science suitable for any but students already of advanced professional rank. Now, fortunately, the situation is changing for the better. The present work comes well timed, to meet a rising interest in the soil and its conservation. Worth noting is the fact that the author, who is in the U. S. Department of Agriculture, is an ecologist as well as a pedologist.

Science News Letter, November 14, 1936

Natural History

HAND BOOK FOR THE CURIOUS—Paul Griswold Howes—*Putnam*, 364 p., illus., \$3.75. A natural history book on invertebrates and the lower vertebrates. Each page of text is faced by a full page of illustrations, mostly halftones.

Science News Letter, November 14, 1936

Philosophy

THE STRUCTURE OF RELIGIOUS EXPERIENCE—John Macmurray—*Yale Univ. Press*, 77 p., \$1.50. An effort to obtain an objective, empirical insight into the mind of the religious person. The author is Grote Professor of Philosophy of Mind and Logic in the University of London.

Science News Letter, November 14, 1936

Medicine

EPIDEMIC CEREBROSPINAL FEVER AMONG TRANSPACIFIC STEERAGE PASSENGERS—Iwao M. Moriyama—*Univ. of Calif. Press*, 53 p., 50c. This report, of interest chiefly to health officers and shipping companies, traces the probable source of the 1931-32 epidemic and gives numerous recommendations for handling steerage passengers so as to avoid epidemics of any sort.

Science News Letter, November 14, 1936

Fiction

FROM COAST TO COAST WITH THE U. S. AIR MAIL—Lewis E. Theiss—*W. A. Wilde Co.*, 310 p., \$2. A story of a pilot's adventures.

Science News Letter, November 14, 1936

Biology

EVOLUTION AND HEREDITY, THEORIES AND PROBLEMS—Charles Edward Walker—*A. & C. Black, Ltd., London*, 222 p., 6s. A vigorous, up-to-date discussion, suitable for use as a textbook in college courses, or for the general reader who wishes to bring his knowledge of the subject into line with recent research and theoretical developments.

Science News Letter, November 14, 1936

Therapeutics

MATERIA MEDICA AND THERAPEUTICS (6th ed.)—Linette A. Parker—*Lea & Febiger*, 377 p., \$2.50. This edition of a text for students of nursing has been revised to conform to the eleventh revision of the U. S. Pharmacopoeia, published this year. The text is extremely practical and includes chapters on mental therapy and physiotherapy.

Science News Letter, November 14, 1936

Anthropology—Botany

FOOD PLANTS OF THE NORTH AMERICAN INDIANS—Elias Yanovsky—*Govt. Print. Off.*, 83 p., 10c. A list, with brief information on each item, of 1,112 species of plants used as food by Indians. The list is preliminary material compiled for a study of the chemical constituents and food value of native North American plants.

Science News Letter, November 14, 1936

Textiles

TEXTILE FIBERS AND THEIR USE—Katharine Paddock Hess—*Lippincott*, 374 p., illus., \$2.40. Although intended for school use, this book will well repay reading by everyone who uses or is interested in textile fabrics—and that includes all persons except savages in the equatorial regions, and nudists. Particular attention is paid to rayon and the other new synthetic fibers.

Science News Letter, November 14, 1936

Television—Radio

TELEVISION; Vol. 1, July, 1936—*RCA Institutes Technical Press*, 452 p., Free to subscribers to RCA Review.

RCA REVIEW; Vol. 1, no. 1, July, 1936—*RCA Institutes Technical Press*, Quarterly, \$1.50 per year, 50c per copy. The collected addresses and papers on television provide a convenient and illuminating record of progress in this field by RCA, while the inaugural issue of this new quarterly performs a similar service over a wider field.

Science News Letter, November 14, 1936

•First Glances at New Books

Additional Reviews
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General Science

SCIENTIFIC PROGRESS — Sir James Jeans, Sir William Bragg, E. V. Appleton, E. Mellanby, J. B. S. Haldane, and Julian Huxley—*Macmillan*, 210 p., \$2. Six lectures covering the universe, physical science, atmospheric electricity, medical science, human genetics, and social needs, written by six eminent British men of science with their usual clarity and interest.

Science News Letter, November 14, 1936

Chemistry

CATALYTIC REACTIONS AT HIGH PRESSURES AND TEMPERATURES—Vladimir N. Ipatieff—*Macmillan*, 786 p., \$7.50. One of the world's outstanding chemists in the field of catalytic reactions summarizes and collects his researches of the past 35 years into what is called a chemical autobiography.

Science News Letter, November 14, 1936

Agriculture

IDENTIFICATION, HISTORY, AND DISTRIBUTION OF COMMON SORGHUM VARIETIES—H. N. Vinall, J. C. Stephens, J. H. Martin—*Govt. Print. Off.*, 102 p., 25c. Sorghums are being increasingly planted, both as binder crops in strip and terrace cultivation and as drought-resistant fodder crops. This bulletin is therefore especially timely.

Science News Letter, November 14, 1936

Horticulture

PIONEERING WITH FRUITS AND BERRIES—George D. Aiken—*Stephen Daye Press*, 94 p., \$2. A practical Vermont nurseryman tells what to plant and how to take care of it, to achieve success where climate is hard, and planting sites must be judiciously chosen. This book should be valuable in regions ecologically comparable with New England.

Science News Letter, November 14, 1936

Economics

ELECTRICITY: FOR USE OR FOR PROFIT?—Bernhard Ostrolenk—*Harper*, 211 p., \$2. A plea for further development of such public policies as will help to secure the more widespread use of cheap power than our country has thus far enjoyed.

Science News Letter, November 14, 1936

Ecology

THE COMPOSITION AND DYNAMICS OF A BEECH-MAPLE CLIMAX COMMUNITY—Arthur B. Williams—*Cleveland Museum of Natural History*, 92 p., 50c.

A monograph covering both the plant and animal ecology of a formation that once dominated most of the north-eastern United States. Of especial interest are some of the diagrammatic methods adopted by the author to give at a glance the essential character of the biosociological aspects of the area studied.

Science News Letter, November 14, 1936

Economic Geography

PROBLEM STUDIES IN ECONOMIC GEOGRAPHY (rev. ed.)—Lenox E. Chase—*Prentice-Hall*, 135 p., illus., maps, 96c. A study guide for use with any standard text, covering the ten most important products of the United States and the foreign trade problems of this country. The guide presents important facts, outlines study assignments, questions to be answered. Suggested readings are listed.

Science News Letter, November 14, 1936

Regional Planning

AMERICAN PLANNING AND CIVIC ANNUAL—Harlean James, Ed.—*American Planning and Civic Assn.*, 540 p., \$3. to public, \$2. to members of the Assn. A comprehensive record of proceedings and papers before various conferences on planning, national parks, state parks, etc.

Science News Letter, November 14, 1936

General Science

SCIENCE, A STORY OF PROGRESS AND DISCOVERY—Ira C. Davis and Richard W. Sharpe—*Holt*, 491 p., \$1.72. Features that especially recommend this general science text are the diagrammatic clearness of its illustrations and the rapid but essentially correct historical summaries bringing the stories of various sciences "down to now."

Science News Letter, November 14, 1936

Entomology

MORPHOLOGY OF THE INSECT ABDOMEN, Part III. The Male Genitalia—R. E. Snodgrass—*Smithsonian Institution*, 96 p., 40c. Continuation of Dr. Snodgrass's series of scholarly monographs on insect anatomy.

Science News Letter, November 14, 1936

Evolution

FLOW OF HORIZONS—D. Owen Stephens—*John Day*, 190 p., \$2.50. This is a book on evolution quite unlike any other that has ever appeared. While it is deliberately a literary rather than a popular-science discussion, it avoids the novel form which such presentations have hitherto essayed. It is something much more modernistic than that: it is a series of very short pictures of emotional states of all kinds of organisms from the scarcely-living slime of the archaozoic to artist and scientist of medieval times and today. The ejaculatory style occasionally gives a sense of breathlessness, but is none the less very effective.

Science News Letter, November 14, 1936

Philosophy

A WORLD OF CHANCE—Edward Gleason Spaulding—*Macmillan*, 293 p., \$3. The McCosh professor of philosophy at Princeton presents a thorough-going indeterministic position as regards the structure of reality. By indeterminism, he means the absence of necessity, and positively the presence of chance or contingency.

Science News Letter, November 14, 1936

Photography

NEW WAYS IN PHOTOGRAPHY; IDEAS FOR THE AMATEUR—Jacob Deschin—*Whittlesey House*, 307 p., illus., \$2.75. Photography is still one of the most interesting of hobbies. Here is an unusual sort of first aid to the amateur, a readable handbook full of ideas and suggestions for unusual photographs—flashes, worm's-eye views, transparencies, photo-wallpaper, etc.

Science News Letter, November 14, 1936

Economic Geology

ECONOMIC GEOLOGY OF MINERAL DEPOSITS—Ernest R. Lilley—*Holt*, 811 p., \$5. After a fairly extended discussion of the origin of mineral deposits and a chapter on technical considerations, the principal mineral resources are taken up *seriatim*, for both geographic and economic discussion. A book primarily for professionals, but not too difficult for the serious general reader.

Science News Letter, November 14, 1936

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